

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
3 May 2001 (03.05.2001)

PCT

(10) International Publication Number  
**WO 01/30218 A1**

(51) International Patent Classification<sup>7</sup>: **A47J 31/06, 31/40** [CH/CH]; Hagenbuchstrasse 30c, CH-9000 St.-Gallen (CH).

(21) International Application Number: **PCT/EP00/09514** (74) Agent: **THOMAS, Alain**; Avenue Nestlé 55, CH-1800 Vevey (CH).

(22) International Filing Date:  
28 September 2000 (28.09.2000)

(81) Designated States (national): AE, AU, BR, CA, CN, CZ, HU, ID, IL, JP, MA, MX, NO, PL, SG, SI, SK, TR, UA, US.

(25) Filing Language: English

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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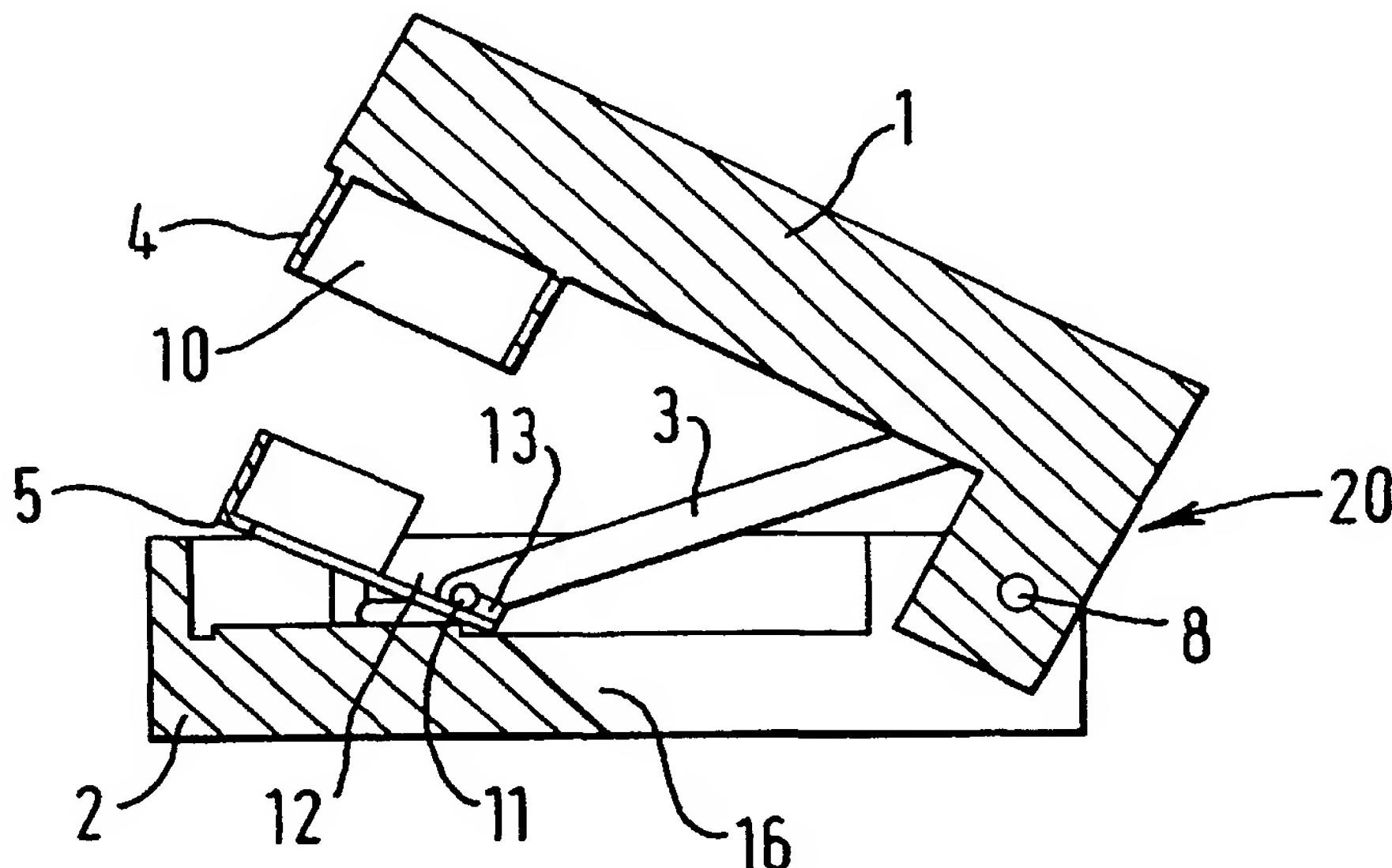
**Published:**

- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CARTRIDGE EJECTION DEVICE



(57) Abstract: The present invention relates to a device for ejecting a cartridge of a coffee machine comprising a jaw (20) with a fixed part (2) and a moving part (1), the said jaw parts forming, in the closed position, a housing (10) for the said cartridge on the front of the said jaw, the moving part being mounted so that it can rotate on the rear of the fixed part, the said device comprising, on the fixed part, in the region of the cartridge housing, an ejector (5) and a pulling arm (3) mounted on the moving part above the axis of rotation of the said moving part with, at the end of the said arm, a first pin (11) designed to collaborate with catch members (12, 13) of the ejector.

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**Cartridge ejection device**

The present invention relates to a device for ejecting cartridges in a coffee machine comprising a jaw with a 5 fixed part and a moving part.

Systems that allow the ejection of cartridges at the end of extraction in coffee machines comprising a jaw are already known. The principle is based on the 10 presence of an ejector in the lower part of the jaw and the pivoting of the said ejector to remove the cartridge extracted, when the said jaw opens. The drawback with the devices of the state of the art is that the axis of rotation of the ejector is too far 15 away from the portion of coffee to be removed, which leads to the said portion of coffee being catapulted and, in falling, dirtying the machine, in the case of the extraction of a closed cartridge which opens under the effect of the rise in pressure during extraction.

20 The object of the present invention is to optimize an ejection device in which the catapult effect is avoided, and in which the cartridge can be slipped into a waste bin incorporated into the machine.

25 The present invention therefore relates to a device for ejecting a cartridge of a coffee machine comprising a jaw with a fixed part and a moving part, the said jaw parts forming, in the closed position, a housing for 30 the said cartridge on the front of the said jaw, the moving part being mounted so that it can rotate on the rear of the fixed part, the said device comprising, on the fixed part, in the region of the cartridge housing, an ejector and a pulling arm mounted on the moving part 35 above the axis of rotation of the said moving part with, at the end of the said arm, a first pin designed to collaborate with catch members of the ejector.

The pin provided on the pulling arm may have any possible geometrical shape. This pin preferably has a cylindrical shape so that it catches well in the catch members, which thus have a shape that complements that of the pin.

It is possible, in the device according to the invention, to extract closed or open cartridges. By way of closed cartridges, it is possible to envisage the cartridges that form the subject of Patent EP 512 468 and EP 620 203 in the name of the applicant. However, there is no limitation on also being able to use the device according to the invention for other sachets or cartridges or capsules which are closed. It is also possible to use the device according to the invention for open capsules, for example capsules made of plastic or sachets made of filter paper and of nonwovens.

The device according to the invention may also be incorporated into any type of coffee machine designed for cartridge or sachet extraction. It would be possible, for example, to incorporate the device into the machine that is the subject of Patent Application EP 99117107.5 filed on 31 August 1999 in the name of the applicant.

The ejector of the device according to the invention consists of a flat annular system comprising the catch members on a part of the said annular system. These catch members are preferably located on the side of the said annular system and at right angles to the axis of rotation of the said ejector. The axis of rotation of the ejector is arranged just behind the cartridge housing, for example at a distance of between 5 and 15 mm away from the housing.

In a preferred embodiment, the pulling arm comprises a second pin at the same level as the first pin, this second pin being designed to collaborate with a guide

cam of the fixed part of jaw. As with the first pin, this may have any possible geometric shape. As a preference, it has a cylindrical shape identical to that of the first pin. The guide cam of the fixed part 5 of the jaw has an aperture which just allows the said second pin to be introduced and to move therein. This cam provides the pulling arm with good guidance so as to have good ejection and good return of the ejector to the initial position.

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When the jaw opens, it is necessary that the cartridge should not rise up with the moving part of the jaw. The capsule needs to remain in the housing in the fixed part of the jaw. To achieve this, means for retaining 15 the capsule are provided on the ejector. These means may be of any kind. For example, it is possible to use the retaining means which are the subject of Patent Application EP 97202208.1 of 14 July 1997 in the name of the applicant.

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The size of the device according to the invention is not critical. Consideration is normally given to a coffee machine with fixed and moving parts of the order of 10 to 30 cm long.

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The catch members have, on the one hand, to allow the jaw to open and then they have to allow the used cartridge to be ejected. They therefore consist first of all of a recess allowing the pin to slide, and then 30 of a hook, allowing the pin to lift the ejector correctly.

The remainder of the description is given with reference to the drawings in which:

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Fig. 1 is a part section of the device with the jaw closed,

Fig. 2 is a diagrammatic view of Figure 1, from the other side,

Fig. 3 is a part section of the device as it opens,  
Fig. 4 is a diagrammatic view of Figure 3, from the  
other side,

Fig. 5 is a diagrammatic face-on view of Figure 3,

5 Fig. 6 is a part section of the device, fully open,

Fig. 7 is a diagrammatic view of Figure 6, from the  
other side, and

Fig. 8 is a diagrammatic depiction of the ejector  
viewed from above.

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Figs. 1 and 2 show the device closed, Figs. 3 to 5 show  
the device partially open, and Figs. 6 and 7 show the  
device fully open. There is the jaw (20) with its  
15 moving part (1) and its fixed part (2), the said jaw  
opening and closing about an axis of rotation (8). The  
pulling arm (3) with the second pin (7) in the guide  
cam (6) can be clearly seen. This arm (3) rotates about  
the axis (9). The housing (10) for the cartridge is  
formed by virtue of the cage (4) on the moving part (1)  
20 of the jaw (20). The ejector (5) is moved in rotation  
about the axis (14) by virtue of the pin (11) of the  
pulling arm (3). The dogs (11) and (7) lie one in the  
continuation of the other. They are normally of  
cylindrical shape. The ejector has a recess (12) and a  
25 hook (13) to allow the said ejector to pivot with the  
arm (3).

The way in which the device according to the invention  
works is as follows: the consumer places the cartridge  
30 for extraction (not depicted) on the fixed part (2) of  
the jaw (20) in the region of the ejector (5), with the  
jaw in the open position. He then closes the machine  
using the device, not depicted, that is the subject of  
the aforementioned Patent Application EP 99117107.5:  
35 the cartridge is in the housing (10) formed by the cage  
(4). He performs cartridge extraction in a way which we  
will not describe now, because extraction does not form  
the subject of the present invention. The consumer then  
acts, in order to open the jaw, on the opening means

which are the subject of the aforementioned patent application. In lifting, the moving part (1) of the jaw (20) carries along the arm (3) and also the pin (11) at the end of the said arm. As the jaw opens, the lower 5 edge of the cartridge is retained by means (17) so that it does indeed remain on the ejector (5). In the first part of its travel, the pin slides along the recess (12) of the ejector (5) and when it reaches the position of Figs. 3 to 5, the said pin (11) follows the 10 interior shape of the hook (13) and lifts the ejector (5). At this moment, the cartridge slides down the chute (16) to the waste bin. When the ejector is high enough up, the pin (11) uncatches from the hook (13) and the ejector drops back down into the position of 15 Figs. 6 and 7. The guide cam (6) with its pin (7) provides good guidance for the pin (11) in the ejection and while the ejector (5) is dropping back down.

Fig. 8 is a view in the direction of arrow A (Fig. 6) giving a clear view of the ejector. This figure very clearly shows its annular shape and the recess (12) and the hook (13) for ejection. The plate (15) is a separate part which comprises recessed and raised elements in the event of closed cartridge extraction. 25 The retaining means (17) form an integral part of the ejector and are arranged on the front of the fixed part (2) of the jaw (20).

The device according to the invention can be used on 30 any type of coffee machine comprising a type of extraction for ready-to-use doses.

**Claims**

1. Device for ejecting a cartridge of a coffee machine comprising a jaw with a fixed part and a moving part, the said jaw parts forming, in the closed position, a housing for the said cartridge on the front of the said jaw, the moving part being mounted so that it can rotate on the rear of the fixed part, the said device comprising, on the fixed part, in the region of the cartridge housing, an ejector and a pulling arm mounted on the moving part above the axis of rotation of the said moving part with, at the end of the said arm, a first pin designed to collaborate with catch members of the ejector.
2. Device according to Claim 1, characterized in that the ejector consists of an annular system comprising the catch members on part of the annular system.
3. Device according to either of Claims 1 and 2, characterized in that the ejector is mounted to rotate about an axis just behind the cartridge housing.
4. Device according to one of Claims 1 to 3, characterized in that the pulling arm comprises a second pin at the same level as the first pin, this second pin being designed to collaborate with a guide cam of the fixed jaw.
5. Device according to one of Claims 1 to 4, characterized in that the ejector comprises means for retaining the cartridge.
6. Device according to one of Claims 1 to 5, characterized in that the length of the fixed and moving parts of the jaw is between 10 and 30 cm.

7. Device according to one of Claims 1 to 6, characterized in that the catch members consist of a recess ending in a hook-shape.

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FIG. 1.

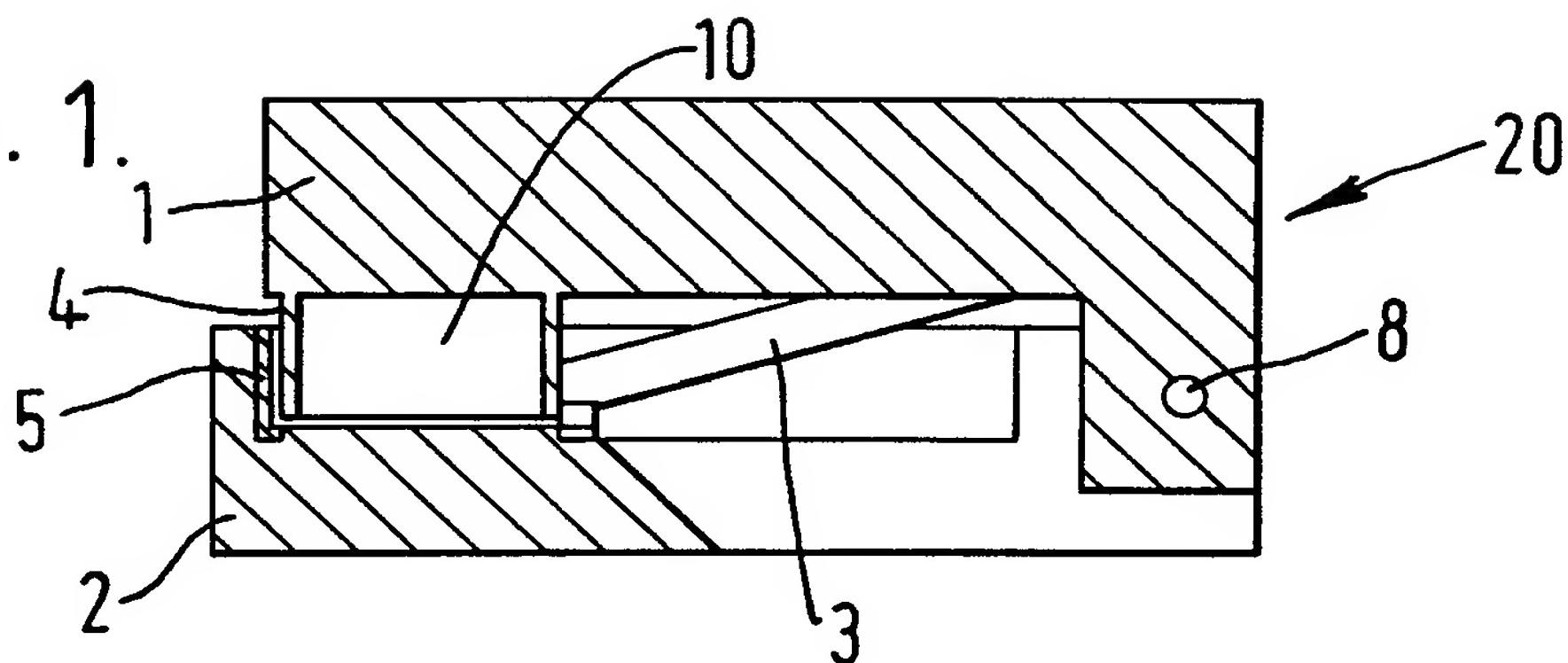


FIG. 2.

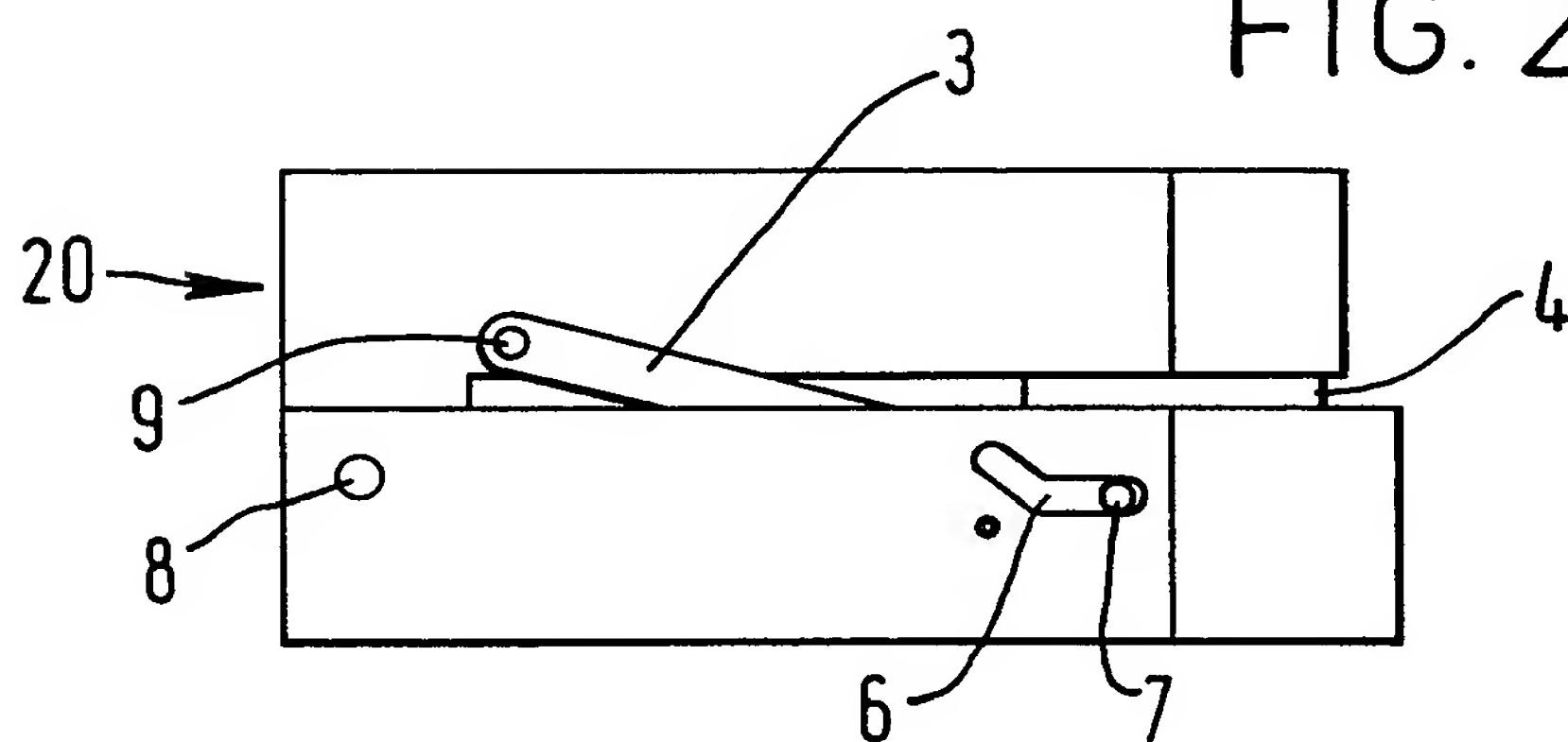
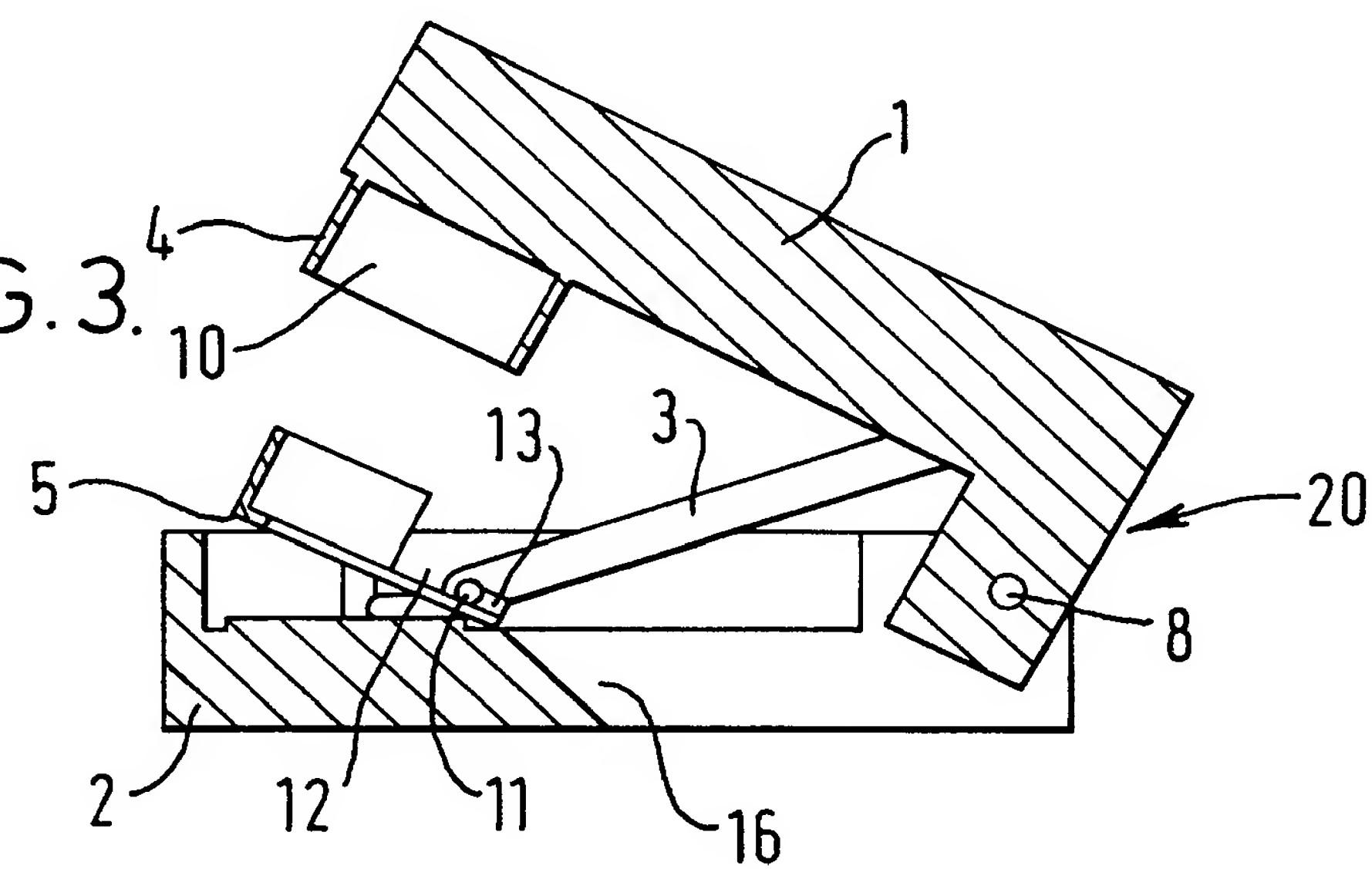
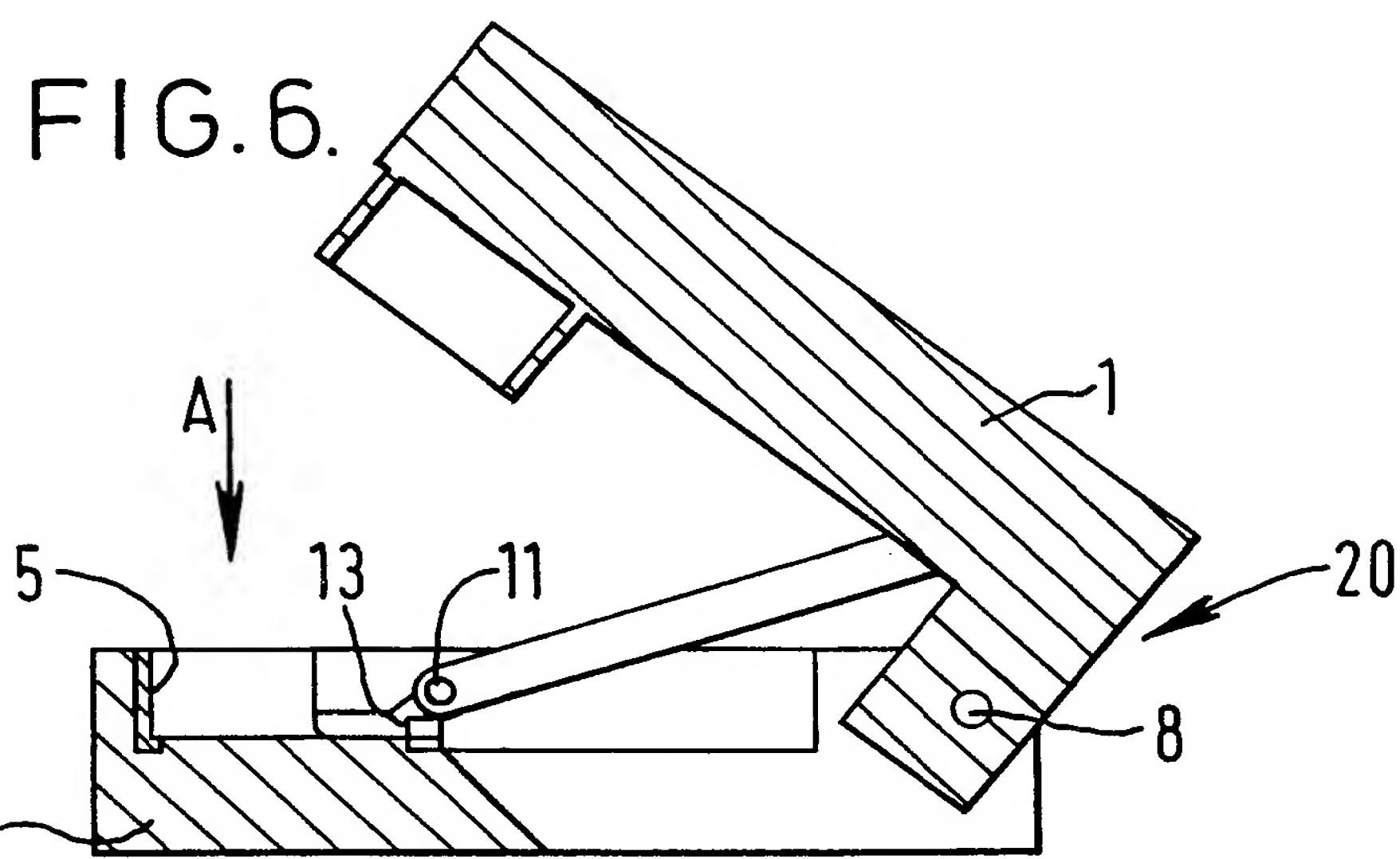
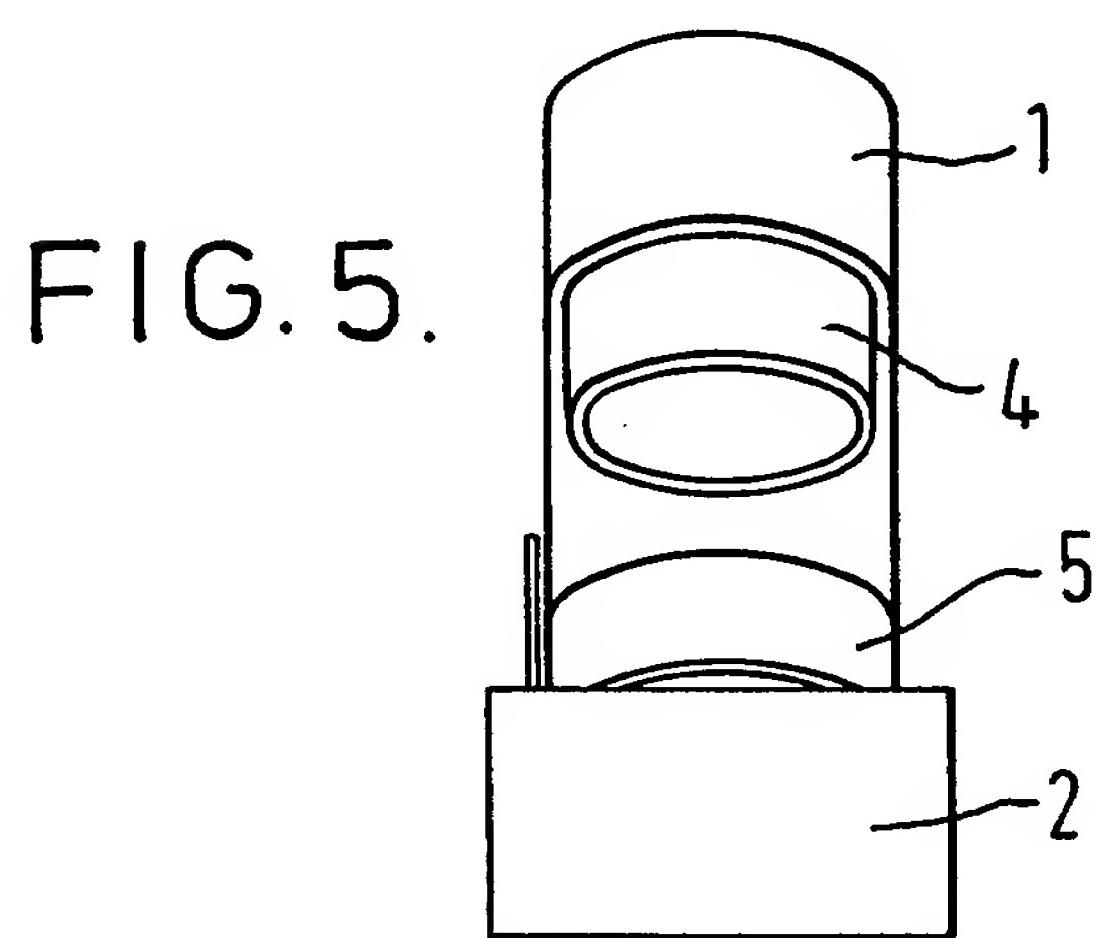
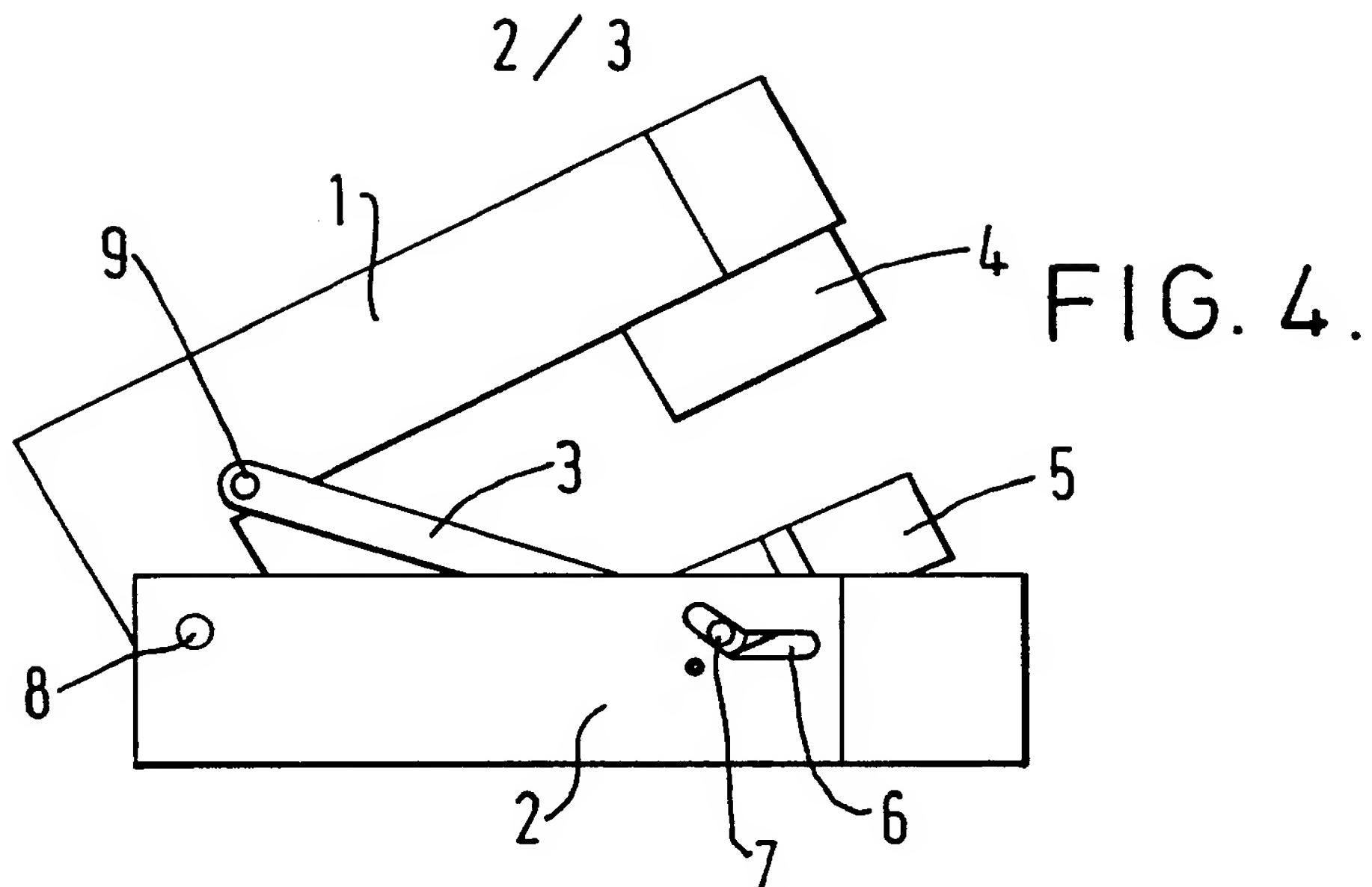


FIG. 3.





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FIG. 7.

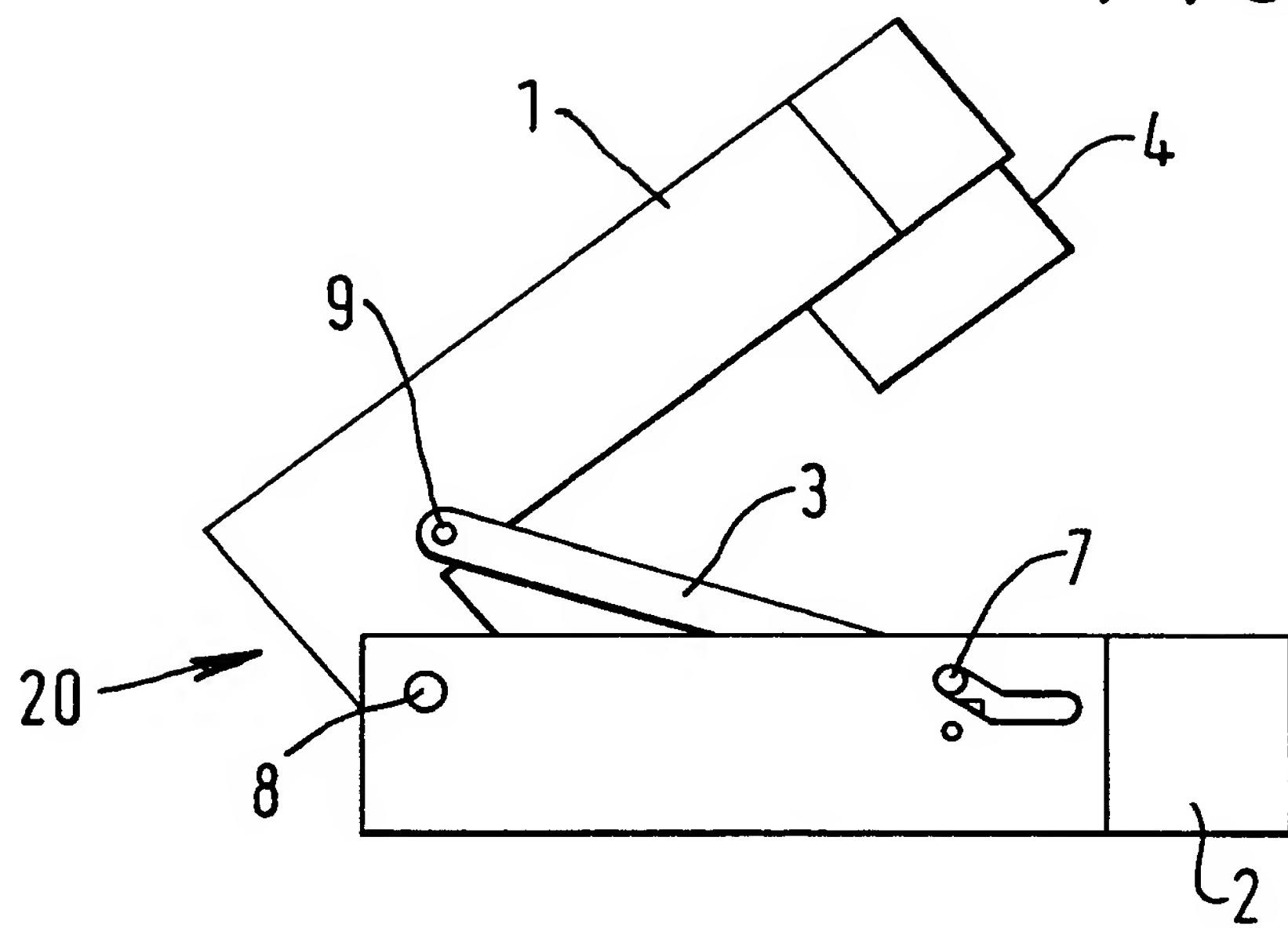
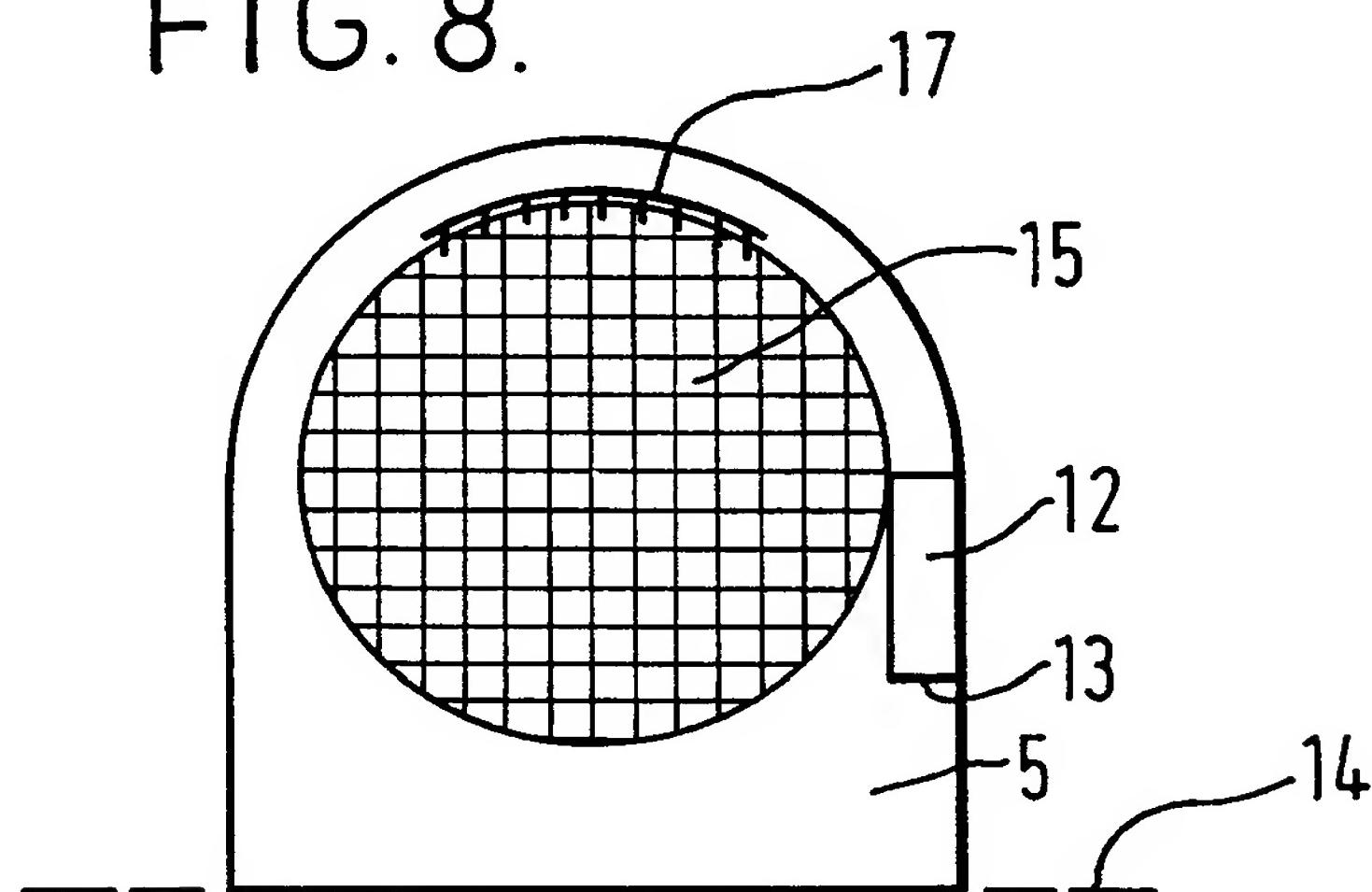


FIG. 8.



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/09514

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 A47J31/06 A47J31/40

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	EP 0 555 775 A (DOMEL) 18 August 1993 (1993-08-18) abstract; figures ----	1
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A	US 3 470 812 A (LEVINSON) 7 October 1969 (1969-10-07) abstract; figures ----	1
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

5 March 2001

Date of mailing of the international search report

14/03/2001

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**INTERNATIONAL SEARCH REPORT**

International Application No

PCT/EP 00/09514

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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